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TRANSLATION

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

Date of mailing *(day/month/year)*	See form PCT/ISA/210
Applicant's or agent's file reference: P2003,0834WO	FOR FURTHER ACTION: See paragraph 2 below
International application No.: PCT/DE2004/002603	International filing date *(day/month/year)*: 24.11.2004
Priority date *(day/month/year)*: 28.11.2003	
International Patent Classification (IPC) or both national classification and IPC: H01S5/024	
Applicant: OSRAM OPTO SEMICONDUCTORS GMBH	

1. This opinion contains indications relating to the following items:

- ☒ Box No. I — Basis of the opinion
- ☐ Box No. II — Priority
- ☐ Box No. III — Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV — Lack of unity of invention
- ☒ Box No. V — Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI — Certain documents cited
- ☐ Box No. VII — Certain defects in the international application
- ☒ Box No. VIII — Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/EP	Authorized officer
Facsimile No.	Telephone No.

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Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims		YES
	Claims	1-15	NO
Inventive step (IS)	Claims		YES
	Claims	1-15	NO
Industrial applicability (IA)	Claims	1-15	YES
	Claims		NO

2. Citations and explanations:

1. The following search report citations (D1-D2) are mentioned in this opinion; the same numbering will be used throughout the procedure:

D1: US-A-5 978 396

D2: ENDRIZ J G ET AL: "HIGH POWER DIODE LASER ARRAYS" IEEE JOURNAL OF QUANTUM ELECTRONICS, IEEE INC. NEW YORK, US, vol. 28, no. 4, 1 April 1992 (1992-04-01), pages 952-965, XP000272686 ISSN: 0018-9197

2. The subject matter of claims 1-7, 11-15 is not novel within the meaning of PCT Article 33(2).

D1 is regarded as closest prior art.

2.1 D1 discloses a method for producing an optoelectronic component comprising an LD bar operated in pulsed fashion (figure 2; column 3, lines 4-11) on an actively cooled cooling element (figures 3, 4; column 3, lines 4-36) produced e.g.

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from CuW (column 4, lines 13-15), and two substrates acting as heat sinks (figure 2; column 3, lines 4-11), in which case, during pulsed operation of the LD with the repetition rate of 10 Hz and the pulse duration tp = 0.1 ms, given an emitted power of 100 W (column 5, lines 50-52), temperature changes ΔT of at most 12 K of the component take place with a thermal time constant (figure 9; column 5, lines 9-24; the thermal time constant results from a trivial rearrangement of formula (3)), the thermal time constant, for reducing the amplitude of the temperature change ΔT, being adapted to the pulse duration tp by optimizing the thickness of the substrate to 0.1 mm (column 5, lines 29-46; wall thickness and thickness of the substrate are synonymous in this case; it is clear from the definition of the transient temperature (figure 9; column 4, lines 63-67) that the latter must relax with a time constant, which also implicitly becomes clear from formulae (2) and (3) in column 5, in which case, however, the result for the thickness calculation for predetermined boundary conditions is specified directly; see claim 18 as well; for this reason it also follows immediately from formula (2) that the thermal time constant must be greater than or equal to tp).

Therefore, the subject matter of claims 13-15 is not novel within the meaning of PCT Article 33(2).

2.2 Claims 13-15 define a method for producing a

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component as defined in claims 1, 11, 12. Since the subject matter of claims 13-15 is not novel and D1 additionally discloses the features of claims 2-7 (see point 2.1 above), the subject matter of claims 1-7 is also not novel within the meaning of PCT Article 33(2).

3. Dependent claims 8-10 do not appear to contain any additional features which, in combination with the features of any claim to which claims 8-10 refer back, meet the PCT requirements for novelty and inventive step. The reasons are as follows:

3.1 The component as defined in claim 7 is known from D1 (see point 2 above) and it is obvious to use a cooler with microchannels for efficient cooling because this is used as standard for this purpose. D2 discloses e.g. a microchannel cooler for cooling an LD bar operated in pulsed fashion with a wall thickness of 1 mm (figure 17; page 959, left-hand column).

Therefore, the subject matter of claims 8-10 does not comprise an inventive step within the meaning of PCT Article 33(3).

3.2 Furthermore, document D2 is also prejudicial to the novelty of the subject matter of claims 1,6-12 because a method for producing a linear diode array with pulses having the length of 0.2 ms and with a power of 60 W on a microchannel cooler with intervening Cu block having a thickness of 1 mm is disclosed, the thickness of the Cu block having been optimized for a predetermined pulse width to repetition rate (page 956, section 4; see, in particular, the "duty cycle" for a given pulse

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duration; and figure 17, page 959, left-hand column; microchannel coolers are also usually produced from Cu, so that it is obvious to produce Cu block and microchannel coolers from one piece and the thickness of the Cu block thus corresponds to the wall thickness; even though a thermal time constant is not explicitly mentioned in D2, it is nonetheless implicitly clear from D2 that the transient excess heat after a pulse emission is to be dissipated in an optimized manner from the diode array and the thermal time constant can be calculated in a trivial manner from the variables given in D2 such as thermal conductivity and the material parameters of copper; the concept of the invention, namely that the wall thickness of the Cu block must be chosen to be thick enough to enable high thermal powers to be stored for a short time in the case of pulsed diode arrays, is clearly disclosed in D2).

Therefore, the subject matter of claims 1, 6-12 is not novel within the meaning of PCT Article 33(2).

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Box No. VIII **Certain observations on the international application**

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

As set out below, one feature in device claim 1 relates to a method for producing the device and not to the definition of the device on the basis of its technical features. Therefore, contrary to the requirements of PCT Article 6, the intended restrictions do not emerge clearly from the claim.

The feature objected to is "the thermal time constant τ, for reducing the amplitude of the temperature changes, ... adapted to the pulse duration D ...".

This objection is in particular also confirmed by the fact that exactly the same wording has been chosen in method claim 14.